

1 Substitution

- a) Work out $3a^2 - 2ab$ when $a = -4$ and $b = 5$.
- b) The energy, E joules, of a ball of mass m kg moving at v m/s is $E = \frac{1}{2}mv^2$. Find E when $m = 0.45$ and $v = 8$.

a) $3 \times 16 + 40 = 88$

b) $0.5 \times 0.45 \times 64 = 14.4$ joules

2 Rearranging formulae

- a) Make t the subject of $p = \frac{3t+1}{5}$.
- b) Make r the subject of $V = \frac{4}{3}\pi r^3$.

a) $5p = 3t + 1, t = \frac{5p-1}{3}$

b) $r^3 = \frac{3V}{4\pi}, r = \sqrt[3]{\frac{3V}{4\pi}}$

3 The subject appears twice

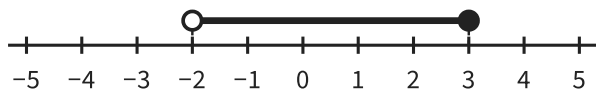
- a) Make x the subject of $ax + 3 = bx + 7$.
- b) Make y the subject of $x = \frac{2y+1}{y-3}$.

a) $ax - bx = 4, x = \frac{4}{a-b}$

b) $xy - 3x = 2y + 1, y(x-2) = 3x+1$
 $y = \frac{3x+1}{x-2}$

4 Inequalities on a number line

- a) Write down the inequality for x shown on the number line.
- b) n is an integer in this inequality. Find the sum of all the possible values of n .



a) $-2 < x \leq 3$

b) $-1 + 0 + 1 + 2 + 3 = 5$

Inequalities and formulae revision mat answers

Higher A

5 Solving inequalities

- a) Solve $5 - 2x > 11$
- b) n is an integer. $2n + 9 > 4$ and $3n - 1 \leq 8$. List the possible values of n .

a) $-2x > 6, x < -3$

b) $n > -2.5$ and $n \leq 3$

$-2, -1, 0, 1, 2, 3$

6 Solving inequalities: forming

A rectangle is 5 cm wide and $(2x + 3)$ cm long. Its area is more than 25 cm^2 and less than 60 cm^2 .

- a) Write a double inequality for the area in terms of x .
- b) Solve it to find the range of values of x .

a) $25 < 5(2x + 3) < 60$

b) $25 < 10x + 15 < 60$

$1 < x < 4.5$

7 Quadratic inequalities

Solve

a) $x^2 - 2x - 15 < 0$

b) $2x^2 > 7x + 4$

a) $(x-5)(x+3): -3 < x < 5$

b) $(2x+1)(x-4) > 0$

$x < -0.5$ or $x > 4$

8 Using the formulae sheet

Use the compound interest formula from your formulae sheet. £3200 is invested at 2.5% compound interest a year.

- a) Find the total after 4 years.
- b) After how many whole years is the total first more than £4000?

a) $3200 \times 1.025^4 = \pounds 3532.20$

b) $3200 \times 1.025^9 = \pounds 3996.36$

$3200 \times 1.025^{10} = \pounds 4096.27: 10 \text{ years}$